

At the Acquisition Senior Leaders' Conference, Aug. 9-12, 2004, LTC Andrew R. Ramsey, Product Manager (PM) for Ground Maneuver UAV Systems, demonstrated the Raven used for launch training. (U.S. Army photo by Mike Roddin.)

Raven Flies Into Action

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Ground troops in company-size or smaller units are getting help from above with an emerging class of unmanned aerial vehicles (UAVs) compact enough to be carried in rucksacks.



LTC Andrew R. Ramsey, PM for Ground Maneuver UAV Systems, sends a Raven used for training into flight. (U.S. Army photo by Mike Roddin.)

The stealthy Raven, developed by the U.S. Army Soldier Systems Center, Natick, MA; U.S. Special Operations Command's (USSOCOM's) Special Operations Acquisition and Logistics; and AeroVironment Inc., Monrovia, CA; is among the latest in small UAVs that give Soldiers a bird's-eye view of the battlefield for beyond-line-of-sight reconnaissance and surveillance. The Raven resulted from the Military Operations in Urban Terrain Advanced Concept Technology Demonstration (MOUT ACTD) intelligence gathering and dissemination requirement.

The demonstration sought to improve operational effectiveness of Soldiers

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and Marines operating in urban and built-up areas through integration of advanced technologies and associated tactics, techniques and procedures (TTPs).

Among the candidates of commercial products, the Pointer UAV from AeroVironment Inc. was selected during a 1998 market survey. With the completion of MOUT ACTD in 2002, the ACTD and Urban Technology Office at Natick transitioned to the USSOCOM-sponsored Pathfinder ACTD. This was done in an effort to integrate unattended ground vehicles, UAVs and smart sensors into a mobile, self-forming network, which would provide enhanced situational awareness,

command, control and communications to commanders and assault forces during urban reconnaissance.

Raven, introduced last year, gets its roots from Pointer and was developed from the MOUT and Pathfinder ACTDs. "Up until MOUT ACTD, UAVs were used as a strategic asset at higher echelons," said Andy Mawn, ACTD and Urban Technology Program Manager. "The first breakthrough was that we could make them for light infantrymen. The second came when the technology matured sufficiently to operate a UAV of that size."

"We understand Soldiers at the dismounted infantry level," Mawn added, explaining how his office became involved with aircraft. "From MOUT ACTD, we had constant interaction with Soldiers. They're the

real designers. We always kept it focused on small and simple.”

The Raven adopts the same basic design and function as the Pointer, but in the smaller package that Soldiers wanted. The aircraft's wingspan was reduced from 9 to 4 1/2 feet and its

weight from 9 to 4 pounds. The Raven is designed for two

operators, a pilot and mission controller, although one operator is possible. It is deployed with four to six troops who can share the equipment load and secure the perimeter. Other components in a Raven package are the ground control unit, video display terminal or laptop monitor, and batteries totaling about 30 pounds.

“Soldiers are learning that the Raven is worth the extra weight. You know they like it when they're willing to carry it without being ordered,” said Susan McKinney, Deputy Program Manager, ACTD and Urban Technology.

The aircraft is assembled in less than 3 minutes using plastic clips to fasten seven gray modular Kevlar® composite pieces stored in two cases. Depending on the mission, the aircraft's detachable nose carries a daytime video camera with simultaneous front and side view, an infrared video camera with front view or infrared video camera with side view.

AeroVironment Inc. worked with SSC and USSOCOM's Special Operations Acquisition and Logistics to build the Raven.

Hand-launched from a standing position — similar to throwing a football — the aircraft gains altitude quickly and is directed by an operator controller in full-manual mode. It is then steered left or right at a constant altitude in the semiautonomous mode or

completely controlled free of any operator input in the autonomous mode. Powered by a single propeller connected to a direct-drive electric engine, the aircraft's advanced avionics steady the flight while a Global Positioning System and electronic compass provide redundant navigation systems in case one fails. The ground control unit guides the aircraft, programs mission waypoints and displays what is seen by the aircraft.

From as far away as 6 miles, the system transmits live airborne video images and location information to the ground control unit and remote video terminal, and records the video for later analysis. Troops can track the enemy, secure convoys, protect base camps, identify targets and assess battle damage.

“A lead vehicle in a convoy can fly the Raven to see what's up ahead. It helps Air Force tactical air controllers describe the target from a pilot's perspective,” Mawn said. “They're still figuring out

uses for it. Flying it is simple, but what to do with the information is the challenge.”

In the event of a lost radio signal, the aircraft goes into “fly home” or “rally point” mode so that it can be safely recovered. Flight time is limited to about 90 minutes, and landing is nothing less than an operator-controlled crash, the pieces scattering apart as it is commanded into a “deep stall.” Underbelly padding helps dissipate energy, but the Raven is susceptible to damage if it strikes a pointed surface such as a jagged rock.

“Demand has been so high for the system, we would have experimented with them more, but we haven't had the chance to quantify system performance or work with the TTPs,” Mawn said. More than 100 Raven systems are going into production this year and will be deployed to support troops in Afghanistan and Iraq. Training is ongoing for units planning to fly the Raven.

Planned upgrades include an even smaller and lighter ground control unit, a higher resolution video screen, enhanced infrared video camera resolution, simultaneous front and side infrared camera capability and an antenna that reduces potential exposure to the enemy.

For more information about the Soldier Systems Center, visit <http://www.natick.army.mil>.

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